WATER CONSERVATION NEWS

"Building sustainability, reliability, and accountability through efficient water use"

In this issue...

Irrigation Management Critical to Making Fine Wines at Niebaum-Coppola Winery

By Peter Brostrom

Niebaum/Coppola Irrigation Specialist, Enrique Herrero (left) and Vintner Scott McLeod stand alongside a newly replanted vineyard block.

Vintner Scott McLeod thinks that good quality grapes are perhaps the most important criteria in making fine wines and he should know. McLeod is the head winemaker at Niebaum-Coppola Winery (founded by G. Niebaum in 1887 and bought by filmmaker Francis Ford Coppola in 1975) in Napa, California. He spends a good portion of his day managing the vineyards as well as overseeing the winemaking process. The grapes grown at the winery are used to make an expensive estate wine; so growing high quality grapes is essential to the winery. To grow good quality grapes the vineyard has to have the right combination of components. The vineyard has to match grape variety, rootstalk and planting density with the soil and microclimate of that specific block of land. Once the vines are planted, irrigation management becomes critical to producing quality wine grapes.

Historically, the vineyard was dry farmed; the vines would grow through the summer using moisture stored in the soil from the winter rains. With dry farming the vines would grow fast and large in the early summer and then be stressed as the soil dried out later in the season. The vines developed a large canopy, which blocked the sun from reaching the grapes and reduced the grape color at harvest. Dry farmed grapes also tended to be larger and lower in tannins. Because grape quality is measured by the level of fruit color and tannins, this method produces lower-quality grapes. So, to improve grape quality, the winery started to replant the vineyards with tighter plant spacing and less vigorous rootstalks so that the vines would use up the available soil moisture earlier in the spring and be water-stressed earlier in the summer. This early season stress limits vine growth and canopy size, which allows more light to reach the fruit and improves the color of the grapes. The early season stress also helps limit the size of grape berries. Smaller berries have a greater ratio of skin to fruit and a higher level of tannins. The vines are kept under water stress until the vegetative growth stops. Irrigation rates are increased later in the season to allow the vine to allocate sugars to the fruit.

Niebaum-Coppola has been deliberately under irrigating for the past 10 years and practicing regulated deficit irrigation for the past two years. Under regulated deficit irrigation, the plant is kept at a certain threshold stress level based on the plants' growth stage. Early in the season the vines are kept at a higher stress level to reduce vegetative growth. Once the grapes begin to change color, the stress level is reduced to allow for a normal ripening process. Plants' leaf stress levels are measured once a week and the irrigation rate and schedule is adjusted to maintain the stress threshold. The winery also

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New Tools for Estimating Crop Water Requirement and Applied Water

By Morteza Orang, Department of Water Resources

Consumptive Use Program

The Consumptive Use Program, an application written in MS Excel, is a tool to help water agencies, engineers, consultants, educators, and growers obtain estimates of crop water requirement for irrigation scheduling. The program uses weather data and calculates historical means of reference evapotranspiration (*ETo*) The program gives improved crop coefficient (*Kc*) values for estimating crop evapotranspiration (*ETc*). The application outputs a wide range of tables and charts, in English or metric units, that are useful for irrigation planning. For more information and publications and how to order a free compact disc on CUP, visit www.waterplan.water.ca.gov/landwateruse/wateruse/Ag/wuagricultural.htm.

Simulation of Evapotranspiration of Applied Water

The Simulation of Evapotranspiration of Applied Water Program was developed through a joint effort between the California Department of Water Resources and the University of California, Davis to help water planners, researchers, engineers, consultants, and water agencies improve long-term estimates of crop evapotranspiration and evapotranspiration of applied water using an improved methodology. It estimates irrigation water requirements for use in water demand planning. SIMETAW simulates many years of daily weather data from monthly climate data to estimate reference evapotranspiration (*ETo*) and crop evapotranspiration (*ETc*). In addition, simulated daily rainfall, soil water holding characteristics, effective rooting depths, and *ETc* are used to determine effective rainfall and to generate hypothetical irrigation schedules to estimate the seasonal and annual evapotranspiration of applied water (*ETaw*). *ETaw* is an estimate of the crop evapotranspiration minus any water supplied by effective rainfall. The simulation program allows one to investigate how climate change might affect the water demand. All of the *ETaw* calculations are done on a daily basis, so the estimation of effective rainfall (*ETaw*) is greatly improved over earlier methods.

The SIMETAW program has other applications including determining water demand by region, studying how changes in the monthly means might affect weather in the future for frost protection, and to fill in missing data from long-term data sets. For more information, publications or to request a free compact disc on the SIMETAW program visit www.waterplan.water.ca.gov/landwateruse/wateruse/Ag/simetaw.htm or contact Morteza Orang at (916) 653-7707, e-mail morang@water.ca.gov.

Office of Water Use Efficiency Mission Statement

In cooperation with others, we promote the efficient and beneficial use of California's water resources to sustain our human and natural environment.

Sacramento Valley Irrigation Training Facility Now Open

By Peter Brostrom

California State University, Chico, has opened a new irrigation training facility on its agricultural research farm. The new $450,000 facility will provide training and classes for Chico State students and the Sacramento Valley agricultural community. Classes will emphasize new and innovative irrigation and water management technology. The center was designed and developed using the experience and guidance of both the Center for Irrigation Training at Fresno State—the Chico center's director, Michael Spiess, came from CSU Fresno—and the Irrigation Training and Research Center at Cal Poly San Luis Obispo. Both of these centers will continue to be involved as the Chico State facility gets started. CSU Fresno will also continue to assist with the pump efficiency programs. ITRC will help teach some of the initial Supervisory Control and Data Acquisition short courses.

The training facility has three main components. The largest and most noticeable component is the pumping plant and model canal structure. This unit sits over a large enclosed reservoir and will be used to demonstrate water management options. The pumping plant has a turbine well pump, a horizontal drive pump and a submersible well. These pumps feed the model canal system. The model canal system features two 100-foot canals that are used to demonstrate water measurement, canal gates, and water management methods. A second component is a deep well SCADA system and a classroom SCADA simulator. SCADA is a system of software and hardware designed for automatic and remote management of water systems. The deep well SCADA system is set up to run seven wells on the research farm. The SCADA system allows the wells to be monitored and managed remotely. The classroom simulator demonstrates how a SCADA system can be used in canal water management. A third element is provided by two variable frequency drives that change the output of electric well pumps by changing the pump speed. Variable frequency drives save considerable energy when different water applications are required from the same well. The training facilities variable frequency drives are integrated into the deep well SCADA system.

Irrigation Training Facility staff person, Brad Laffins (left) and Director Dr. Michael Spies (right) show the model canal pumping facility.

Funding for the facility was provided by the U.S. Bureau of Reclamation, the California Public Utilities Commission, Durham Pump, North State Electric and Pump, and Water Specialties. For more information contact Michael Spiess at (530) 898-4554 or Brad Laffins at (530) 898-6343.

CIMIS Outreach Activities to Begin Soon

By Bekele Temesgen

CIMIS outreach at work.

The Department of Water Resources has recently signed a contract with the University of California, Davis to conduct water use efficiency outreach activities throughout the state. These outreach activities involve several workshops and meetings with agricultural growers, landscapers, and other interested water managers. The meetings are designed to promote water use efficiency through the use of the California Irrigation Management Information System (CIMIS) data. CIMIS is a program in DWR's Office of Water Use Efficiency that manages a network of over 125 agro-climatic weather stations with the objective of providing estimated reference evapotranspiration (ETo) and measured weather parameters. ETo is used for irrigation scheduling and other water management purposes.

Dr. Blaine Hanson of the University of California Cooperative Extension at UCD will be coordinating the project with farm advisors working on agricultural crops and Dr. Richard Snyder of the Department of Land, Air, and Water Resources will be coordinating with turf and landscape advisors. DWR provided funding to UCCE to support workshop organization and handout material expenses. Although the focus of these meetings is on the use of the CIMIS data, organizers can include any

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Winery

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uses weekly soil moisture measurements to schedule irrigations. Extensive yield and quality measurements are made at harvest to evaluate the effect of the irrigation program on quality.

Regulated deficit irrigation and deficit irrigation are not unique to Niebaum-Coppola Winery. A number of vineyards are starting to better monitor irrigation practices and fine-tune their scheduling to produce better quality grapes. UC Cooperative Extension has been researching regulated deficit irrigation for the past 10 years and has shown for certain varieties that quality can be improved by stressing the plant without decreasing yield. For more information contact Peter Brostrom at (916) 651-7034, e-mail brostrom@water.ca.gov.

A Road Map for Desalination in California:

Governor's Task Force Recommends Considering Desalination as Part of a Balanced Water Portfolio

By Fethi BenJemaa, Fawzi Karajeh and Chuck Keene

After six months of deliberations, the California Water Desalination Task Force completed its mission. This mission, as called for by Assembly Bill 2717, (Chapter 957, Statutes of 2002), was to look into potential opportunities and impediments for using seawater and brackish water (water containing more salts than freshwater, but less than seawater) desalination and to examine what role the state of California should play in furthering the use of desalination technology. As a result, the Department of Water Resources submitted a final report to the Legislature that contains the Task Force findings and recommendations; the report was prepared with significant input from its members (comprised of representatives from 27 organizations). It also draws upon the experience of many agencies, experts, and different stakeholders to provide advice and guidance that can be used to facilitate desalination planning. In its submittal letter to the Legislature, DWR explained that the findings should help clarify some of the important issues regarding desalination and help to further the use of desalinated water in California.

The report contained facts and figures about brackish and seawater desalination in general and highlights of environmental issues as well as cost, energy and permitting issues, and an outline of key findings that provides context for evaluating desalination. One of the primary findings is that economically and environmentally acceptable desalination should be considered as part of a balanced water portfolio to help meet California's existing and future water supply and environmental needs. The Task Force also forecasted that the potential for the increased use of desalination in California is significant and that the opportunities are great for providing water supply from seawater and brackish water desalination as well as recovering contaminated groundwater. Existing and envisioned desalination facilities could generate an estimated 700,000 acre-feet per year in the next decade. The Task Force put forward a set of 29 recommendations classified into four categories.

The California Water Desalination Task Force was convened by DWR and was chaired by Deputy Director Jonas Minton with co-chairs from the State Water Resources Control Board, the State Energy Commission, the State Department of Health Services, and the California Coastal Commission. For more information on the Water Desalination Task Force, and a copy of the Findings and Recommendations, visit the Task Force Web site at: www.owue.water.ca.gov/recycle/desal/desal.cfm.

The Desalination Task Force field trip to Marina Coast Water District's desalination facility on August 27, 2003.

The 4th Desalination Task Force meeting on August 26, 2003, in Monterey, California.

Water Desalination Task Force Recommendations

General Recommendations:

1. Since each desalination project is unique and depends on project-specific conditions and considerations, each project should be evaluated on a case-by-case basis.
2. Include desalination, where economically and environmentally appropriate, as an element of a balanced water supply portfolio, which also includes conservation and water recycling to the maximum extent practicable.
3. Ensure equitable access to benefits from desalination projects and ensure desalination projects will not have disproportionate impacts particularly to low-income and ethnic communities.
4. The state should create mechanisms that allow the environmental benefits associated with transitioning dependence on existing water sources to desalinated water to be realized.
5. In conjunction with local governments, assess the availability of land and facilities for environmentally and economically acceptable seawater desalination.
6. Results from monitoring at desalination projects should be reported widely for the broadest public benefits. Encourage opportunities to share information on operational data. Create a database and repository for storing and disseminating information.
7. Create an Office of Desalination within the Department of Water Resources to advance the state's role in desalination.

Water Desalination Task Force Recommendations

(continued)

Energy and Environment Related Recommendations:

8. Ensure seawater desalination projects are designed and operated to avoid, reduce or minimize impingement, entrainment, brine discharge and other environmental impacts. Regulators, in consultation with the public, should seek coordinated mechanisms to mitigate unavoidable environmental impacts.
9. Identify ways to improve water quality by mixing desalinated water with other water supplies.
10. Where feasible and appropriate, use wastewater outfalls for blending/discharging desalination brine/concentrate.
11. Compare reasonable estimates of benefits, costs and environmental impacts for desalination with those for other water supply alternatives realistically available to that area.
12. Recognizing the importance of power costs to the costs of desalination, consider strategies that will allow project sponsors to access non-retail power rates.
13. Clarify the applicability of non-retail energy pricing for desalination facilities.
14. Study the energy intensity and rates currently paid for energy used to provide water from various sources including desalination.
15. Study the potential for developing renewable energy systems in California, in conjunction with desalination implementation strategies.
16. Identify ways that desalination can be used in a manner that enhances, or protects the environment, public access, public health, view sheds, fish and wildlife habitat and recreation.

Planning and Permitting Related Recommendations:

17. To improve communication, cooperation, and consistency in permitting processes, encourage review processes for each desalination project to be coordinated among regulators and the public.
18. Evaluate all new water supply strategies including desalination based upon adopted community General Plans, Urban Water Management Plans, Local Coastal Plans, and other approved plans that integrate regional planning, growth and water supply/demand projections. Environmental reviews should ensure that growth related impacts of desalination projects are properly evaluated.
19. Ensure adequate public involvement beginning early in the conception and development of desalination projects and continuing throughout planning, design and evaluation processes. Coordinate public notification, outreach and public involvement strategies.
20. If multiple desalination projects are proposed within a region, coordinate development and analysis of these projects, including their benefits and cumulative impacts.
21. For proposed desalination facilities co-locating with power plants, analyze the impacts of the desalination facility operations apart from the operations of the co-located facilities. This will identify the impacts of the desalination facility operations when there are reductions in cooling water quantities. This recommendation is not intended to dictate California Environmental Quality Act alternatives that must be evaluated.
22. When desalination projects propose environmental benefits, identify the assurances that those benefits will be realized.
23. Evaluate the effects of desalinated water on existing water supply distribution systems.
24. Each community should consider the appropriate role, if any, for private companies in a desalination project or proposal.
25. Private desalination projects, and private developers and plant operators, should be required to fully disclose the same information as a publicly owned and operated facility.
26. To avoid potential international trade agreement violations, no legal standard or regulation should discriminate against an applicant based on ties to multinational corporations.
27. Investigate the ramifications of designating ocean and estuarine waters in proximity to desalination intakes as drinking water beneficial use.

Funding Related Recommendations:

28. Provide funding for research and development projects (such as feedwater pretreatment, the value and limitations of beach wells for feedwater intake, other technologies to reduce entrainment and impingement impacts, strategies for brine/concentrate management, opportunities for energy efficiencies and application of alternative energy sources and combined energy and desalination technologies).
29. In addition to other eligibility criteria, state funding should give high priority to those desalination projects that provide the greatest public benefits, such as: 1) serve areas implementing all conservation and recycling programs to the maximum extent practicable, 2) demonstrate long-term environmental benefits, 3) avoid or reduce environmental impacts to the extent possible, 4) reduce health risks by improving water quality, and 5) ensure equitable access to benefits from desalination projects and include feasible mitigation for any environmental justice impacts.

Innovative Partnerships Needed to Meet Regional Water Demand

By Fethi BenJemaa and Fawzi Karajeh

According to Bob Griego, Otay Water District General Manager, "Maintaining a reliable water supply is one of the most important issues facing California [and]. . . By teaming up with the City of San Diego, we are utilizing recycled water to help reduce the demand for potable water . . . [and] providing our customers with an abundant amount of recycled water to be used for irrigation and other non-potable water uses." A recently announced historic partnership between OWD and the City of San Diego consists of a landmark 20-year agreement that will send an average of 6 million gallons per day of recycled water produced by the City of San Diego South Bay Water Reclamation Plant to OWD. The reclamation plant, which started operation in June 2002, is capable of producing up to 15 millions gallons a day of recycled water. Recycled water sales will begin no later than January 2007. In the meantime, OWD will have to build the necessary infrastructure with an estimated cost of $35 million for the recycled water delivery to include pumping and storage facilities and 6 miles of pipeline connecting its service area to SBWRP.

Fostering such long-term investment partnerships between different agencies can help achieve mutually beneficial programs and broaden the region's water reliability. As an integral part of a balanced water resources portfolio, water recycling is an economically and environmentally viable option that could play a major role in meeting local and regional water demands with an added bonus of reliability and being drought proof. "Not only will the agreement between the agencies provide significant revenue for the City, it will re-direct the use of water resources in order to maximize the benefit to the district's ratepayers and to the region as a whole. This is exactly the kind of innovative partnership we need to conserve water," says San Diego Mayor Dick Murphy. For more information about the partnership visit www.otaywater.gov.

California to Adopt New Plumbing Code

By Nancy King and Fawzi Karajeh

The California Department of Health Services issues standards for the use of recycled water—highly treated waste water—in Title 22 of the California Code of Regulations. For protection of public health, DHS specifies the levels of recycled water treatment required for specific uses. Several cities and towns in California have been augmenting their water supplies by utilizing recycled water for non-potable uses such as irrigation of cemeteries, golf courses, parks and highway landscaped areas. In addition to the outdoor uses, several California communities use recycled water for the indoor non-potable purposes of floor trap priming, cooling towers, and air-conditioning devices, as well as toilet and urinal flushing in structures. These structures can include commercial or retail or office buildings, theaters, auditoriums, schools, hotels, apartments, barracks, dormitories, jails, prisons and reformatories (except facilities for the treatment of persons with mental disorders).

The use of recycled water for non-potable purposes requires distinct purple-colored piping to transport the recycled water separately from the potable water system. This so-called dual plumbing is an important and crucial component to utilizing recycled water. The codes pertaining to plumbing are contained in the California Plumbing Code, Health and Safety Code, and the California Code of Regulations. In its plumbing code, the International Association of Plumbing and Mechanical Officials publishes Appendix J to provide design standards for indoor dual plumbing installation, construction, alteration, and repair of reclaimed water systems intended to supply water closets, urinals, and trap primers for floor drains and floor sinks. In order to enforce the provisions of Appendix J in California, a state agency with the proper authority must formally adopt it through the Administrative Procedures Act. Currently, no state agency has adopted Appendix J.

In 2001, Assembly Bill 331 (Goldberg) mandated the formation of the 2002 Recycled Water Task Force with the mission to evaluate the current framework of state and local rules, regulations, ordinances, and permits and to identify opportunities for and obstacles or disincentives to increasing the safe use of recycled water in California. During deliberations, the Task Force became aware of the need to adopt Appendix J. Because of the inconsistencies with other California codes and regulations in the 1994 IAPMO version of Appendix J, the Plumbing Code/Cross-Connection Control Workgroup of the Task Force took the opportunity to rewrite the appendix and improve upon the IAPMO version. The Task Force, in its final report to the Legislature, recommended the Department of Water Resources adopt the revised Appendix J draft model code (Task Force Recommendation 3.1.1). DWR's legal review, however, found that DWR does not have the authority to regulate plumbing. Fortunately, DHS does have the authority and since DHS representatives participated on the Task Force and also helped to draft the proposed revised version of Appendix J, DHS accepted DWR's request and agreed to assume the implementation of Recommendation 3.1.1.

For more information contact Fawzi Karajeh, DWR, at fkarajeh@water.ca.gov or Bob Hultquist, DHS, at bhultqui@dhs.ca.gov.

Capitol Park's California Friendly Garden Bed

By Julie Saare-Edmonds

In December 2002, on the corner of 10th and N streets in Capitol Park, one of the last Italian Stone Pines from the original planting fell during a storm. Fortunately, it fell during the night when there were no visitors present. The tree was at least 131 years old, approximately 100 feet tall with a trunk diameter of about 5 feet. For many years it had been propped up by a large metal post but finally age and size became too much for the old tree to bear. The canopy was very large, casting wonderful shade beneath the tree. When the tree fell, two light posts and a palm tree toppled along with it.

It was a sad event to many Capitol Park regulars. The week-long cleanup drew many spectators. But, what remained was a sunny open spot with lots of potential. This open spot was recognized as a great opportunity to plant a type of garden bed that was something of a departure for much of Capitol Park, well known for its *Camellias*, *Azaleas* and rose gardens. In March 2003 the Office of Water Use Efficiency staff met with members of the Capitol Park groundskeeping staff and proposed the idea of designing a water-efficient garden, something along the lines of a Mediterranean climate demonstration garden, preferably one with many California natives. Capitol Park staff agreed; the site was measured and tentative landscape plans drafted. A new Italian Stone Pine was donated and planted in honor of the original tree. This new tree set the tone and provided a focal point. Several *Azaleas* that were not damaged by the original tree were transplanted to other beds, clearing the way for shade-loving California native plants. Two large *Camellias* and a Chinese Holly were left in place because they were too large to transplant easily.

By April the draft design was ready for submittal to Jim De Journett, Senior Landscape Architect of Capitol Park. Mr. De Journett made some revisions and suggested some changes to the plant palette. After a May tour of the facility and demonstration gardens of Cornflower Farms, a well known nursery specializing in California natives, the final plant selections were made. In June, a subsurface drip irrigation system was installed followed shortly by the plants. To help conserve moisture, a layer of mulch was spread on the surface after planting. Unfortunately, hot weather after planting stressed some plants. As every gardener knows, fall is the best time for planting, especially when planting California natives. But in highly visible public spaces such as this, planting can't wait. After an adjustment period, the plants' appearances improved and some became well established through the summer. After this winter they should become very well established and require very little water from now on.

Next time you are in Sacramento, take time to visit Capitol Park, recognized as a historically significant arboretum with trees and other plants from around the world. Many of the plants are rare and seldom found in cultivation, and because of the age of the park many of the plants are mature specimens rarely seen. Some of visitors' favorites are the olive near 13th Street, the cockspur coral tree on 13th Street, the saucer magnolias throughout the park and the great deodar cedars facing 10th Street. So, while you are enjoying the rare plants, memorial monuments and trout and turtles in the pond, and everything else this 40-acre Victorian era garden offers, be sure to stop by 10th and N streets and see our work in progress.

Plants Used in Capitol Park 10th and N Plant Bed

Arctostaphylos "Emerald carpet"*, Emerald Carpet Manzanita
Berberis thunbergii, Japanese Barberry
Carex sp. –Sedge
*Ceanothus thrysiflorus** "Skylark", Skylark Blue Blossum
*Heuchera micrantha**-Coral bells
*Iris douglasiana**- Pacific Coast or Douglas Iris
Pittosporum tobira variegata, Varigated Tobira
*Ribes sanguineum**, Red Flowering Currant

*California Native or hybrid of a California Native

The Original Italian Stone Pine.

The Newly planted Italian Stone Pine.

The newly planted bed with drip tubing and mulch.

CIMIS

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topic that is related to efficient uses of California's water resources. At the end of each workshop, farm and landscape advisors who participated in these outreach activities are required to submit a short report to UCCE. Fram and landscape advisors who are interested in organizing a workshop in their areas can contact Dr. Snyder at (530)752-4628, FAX (530)752-1793, e-mail rlsnyder@ucdavis.edu or in writing at University of California, One Shields Avenue, Land, Air, and Water Resources, Davis, CA, 95616-8627.

DWR Assists in Preparing On-farm Drainage Management Manuals

By Jose Faria

DWR San Joaquin District staff is assisting the Westside Resource Conservation District and its contractor Fresno State's Center for Irrigation Technology in the writing and producing of two manuals on implementation of Integrated On-Farm Drainage Management. IFDM is a system that farmers can use to manage salts and shallow groundwater in drainage-impacted areas. Two manuals are being prepared; one manual is for farmers and laypersons and the other is for technical consultants and engineers. The manuals will be distributed at landowner-focused workshops in February 2004 and at technical-based workshops in late spring or early summer.

The IFDM program is a viable alternative to landowners who may not be able to participate in a land retirement program for drainage-impacted lands. Whatever solution is ultimately selected to manage drainage and salinity on a regional basis, the IFDM Program has shown to be the first step in improving irrigation efficiencies and water conservation and for reducing the volume of drainage effluent that will eventually need treatment and disposal. The principal objectives of IFDM Program's are to utilize drainage water as resource to produce marketable crops, to manage salt and selenium from drainage water directly on the farm, and to enhance environmental benefits of the IFDM program by minimizing or eliminating possible risks to wildlife from subsurface drainage water exposure. The IFDM Program manages irrigation water on salt-tolerant, high-value crops and reuses drainage water to irrigate salt tolerant crops, trees, and halophyte plants. Through this process salt and selenium are removed. For more information contact Jose Faria at (559) 230-3339.

Agricultural Water Management Council

By Mike Wade and Kathryn Charlton

Cooperative Agreement Boosts Membership/Water Management Plan Submittals

The Cooperative Agreement signed December 2001 between the AWMC, the Department of Water Resources and the U.S. Bureau of Reclamation establishes a target of 3.8 million retail acres to be enrolled in the Council by the end of 2003. One of the objectives of the Cooperative Agreement is membership recruitment. As a result, outreach has become a primary task for the Council this past year. In keeping with the target, membership has increased by over 20 percent since January 2003, to a total of 60 water agencies.

Along with an increase in membership there has also been an increase in the number of water management plans submitted to the Council. The Cooperative Agreement also requires all endorsed water management plans to undergo an independent audit. The plans are reviewed for completeness, conformity to the AB 3616 Memorandum of Understanding guidelines, completeness and validity of data and conclusions. The auditors have returned their reports to AWMC and all of the endorsed water management plans have been deemed adequate by the auditors. For more information on AWMC visit www.agwatercouncil.org or call Mike Wade or Kathryn Charlton at (916) 441-7868.

Net Benefit Analysis Application Now Online

New to the Agricultural Water Management Council Web site is an online net benefit analysis application. This application is designed to assist water suppliers in evaluating the benefits and costs of implementing the efficient water management practices established in the AB 3616 Memorandum of Understanding. The new software is an updated and improved version of the previous Excel spreadsheet-based software created in 1998 by the Department of Water Resources. The previous software was an initial attempt to streamline and facilitate the net benefit analysis required in the water management plans. The new Web-based version provides more protection from accidental changes to the program's structure and helps assure more accurate water management plan data reporting. Members can access the net benefit analysis software from the AWMC Web site with a username and password issued by AWMC. After the pages are complete, users can submit their final analysis online. The Web address is www.agwatercouncil.org/wmpfr.htm.

The new net benefit analysis application is an online feature AWMC expects to expand in the future to include biannual progress reports and eventually encompass the entire water management plan reporting process. Making these features available to members will help facilitate the water management plan development and review process as well as improve consistency among the submitted plans.

California Urban Water Conservation Council

By Mary Ann Dickinson, Executive Director

Council to Conduct Research Studies of Avoided Cost and Environmental Benefit

The California Urban Water Conservation Council is about to undertake a research project of significant proportions: How to best quantify the avoided costs and capital costs associated with new water supply development—costs which are avoided when water conservation programs produce "saved water"— and how to estimate the environmental benefits and costs connected to those water conservation programs. Until now, there has not been any easy way to estimate these numbers that are very important to assessing the true value of water conservation in California.

CUWCC has been giving this some thought over the years. In 1996, CUWCC issued guidelines to advise water agencies on how to calculate the costs and benefits associated with water conservation programs. That document is still available from CUWCC, and is widely used by all its member agencies. CUWCC has also built Excel spreadsheets to assist its members further. Unfortunately, neither the guidelines nor the spreadsheets address utility avoided cost calculations in detail, nor do they provide water suppliers with the theoretical underpinnings and practical methods for making such calculations. Likewise for environmental benefits and costs.

Research such as this, however, is expensive. So, seeking funding for the work, CUWCC applied for and received grant funding from the United States Bureau of Reclamation in 2002 to develop more detailed guidance and methods for calculating utility avoided costs and environmental costs and benefits. As a first step, CUWCC undertook a review of the literature addressing utility avoided cost calculation, a copy of which is available by download from CUWCC's Web site (www.cuwcc.org). CUWCC is now developing a specialized research team to begin the actual work involved in these two projects over the next two years. The specific research work will include creating

1. methods to estimate avoided water and wastewater utility operating and capital costs of production, transport, storage, water treatment, wastewater treatment, water supply distribution, and wastewater collection associated with implementation of urban water conservation Best Management Practices, as specified in the *Memorandum of Understanding Regarding Urban Water Conservation in California*. CUWCC is looking for methods that are theoretically sound but capable of being implemented by both small and large water and wastewater utilities in California; and
2. methods to estimate and to attach monetary values to the environmental benefits and/or avoided environmental costs associated with implementation of urban water conservation Best Management Practices. Similar to the avoided cost calculations, the method must be relevant for both small and large water and wastewater agencies. It is likely that the research produced here will also be of great interest to CALFED and other water resource planning agencies.

Council Adds Water Loss Control Manual to its Publications List

Is your water agency having difficulty managing its distribution system water losses? Does your water agency think it is already "water-tight"? The true answers will surprise you. Find out the answers you need in the *Water Loss Control Manual*, a hot selling publication normally retailing for $99 but available at a discount price of $85 from CUWCC. Authored by noted systems water loss expert Julian Thornton, this manual provides step-by-step guidance to utility system water auditing and to reducing water loss in water distribution systems (which is BMP 3 under the Memorandum of Understanding).

In addition to raising awareness of the extent of the water loss problem and current practices, it covers all of the basic tools required to perform a systematic and effective water audit both on paper and in the field. The book discusses how to calculate and evaluate losses and cost-to-benefit ratios and how to set up suitable and sustainable field intervention programs. It also explains the new International Water Association performance criteria for water loss management, which are sweeping the industry and replacing the common terms of "unaccounted for water" that have been used for decades.

To obtain a copy of the Water Loss Manual, contact the CUWCC office at (916) 552-5885 or visit www.cuwcc.org on the publications page.

Water Conservation Events

Water Education Foundation 2004 Water Tours

Lower Colorado River - March 24 to 26
Central Valley - May 12 to 14
Bay-Delta - June 16 to 18
Northern California - September 15 to 17
Southern California - October 6 to 8

The Water Education Foundation's tours offer participants a firsthand look at the water facilities, rivers and regions critical in the debate about the future of water resources in California and the West. Issues of water supply, water quality, environmental restoration, flood management, water marketing, groundwater and water conservation are addressed by a wide range of speakers. Participants learn about local, state and federal issues from a host of experts on all sides. All tours are three days and two nights. Tour registration fee includes transportation and lodging while on the tour, meals and background materials. Registration fee for the tours is: $575 (single occupancy) or $950 (double occupancy). For more information visit www.water-ed.org/tours.asp.

The Irrigation Training and Research Center 2004 Classes

For more information visit www.itrc.org/classes/classindex.html

Designer/Manager School of Irrigation
August 12 to September 2, 2004

The Designer/Manager School is a comprehensive educational program offering a variety of classes designed for both agricultural and landscape irrigation professionals. Each course description (to follow) gives highlights of the course content, any suggested prerequisite, PCA credits available, dates offered, and course fee. All fees include class materials, software, and lunch.

AGRICULTURE/LANDSCAPE COURSES

Basic Soil, Plant and Water Relationships
August 12 and 13 - $275

Topics include: IA Level II material on this topic; texture and structure; water holding capacity, retention; intake rates; evaporation; transpiration; soils classification; and measurement of soil moisture and tension.

Basic Pipeline Hydraulics
August 16 and 17) - $275

Topics include: Pipe materials and sizes; mainline computations, tapered pipe, branches; energy equation, friction, elevation changes; and minor losses. *Deduct $20 if you bring your own laptop computer to this class.*

Pumps I
August 18 - $165

Topics include: Pump curves; pumps in series and parallel; system curves; TDH computations for vertical and booster pumps; efficiency, WHP, BHP, input HP; and pump selection from catalogs.

AGRICULTURE COURSES

Pumps II
August 19 and 20 - $165

Suggested prerequisites for this course include: *Basic Pipeline Hydraulics;* and *Pumps I*. Topics include: NPSH; submersible pumps; well screens and well development; variable speeds; electric and engine; shaft losses, shaft sizing; and maintenance and trouble-shooting.

Chemigation
August 19 - $165

Topics include: Fertilizers; techniques for various irrigation methods; reducing leaching losses; injection equipment and safety; and ITRC book "Fertigation."

Row Crop Drip Irrigation
August 20 - $165

Suggested prerequisite for this course includes: *Basic Pipeline Hydraulics.* Topics include: Design layouts, flushing, fittings; how design relates to management; and hose installation and retrieval.

Drip/Micro Irrigation Design
August 23 to 25 - $400

Suggested prerequisites for this course include: *Basic Soil, Plant aand Water Relationships; Basic Pipeline Hydraulics;* and *Pumps I.* Topics include: Filtration; design procedure of hardware selection; emitter and micro system designs; buried drip for trees and vines; and plugging prevention. *Deduct $20 if you bring your own laptop computer to this class.*

Irrigation Scheduling, Salinity and Drainage
August 26 and27 - $275

Suggested prerequisite for this course includes: *Basic Soil, Plant & Water Relationships.* Topics include: ETo and crop coefficients, practical irrigation scheduling, how efficiency and uniformity influence scheduling, drainage concepts and layouts, salinity and leaching requirements, reclamation

LANDSCAPE COURSES

Landscape Irrigation Auditor
August 23 and 24 - $275

Suggested prerequisites for this course include: *Basic Soil, Plant and Water Relationships*; and *Basic Pipeline Hydraulics.*

Landscape Sprinkler Design
August 25 - $165

Suggested prerequisite: Basic Soil, Plant & Water Relationships; Basic Pipeline Hydraulics. Topics include: Application rates; valves, piping, pipeline sizing; and sprinkler selections, designing blocks.

Microirrigation For Landscape
August 26 - $165
Topics include: Hydraulics of hoses, emitters, and sprayers; equipment selection and maintenance of the system; and matching equipment to plant materials and other stations.

Golf Irrigation Auditor
August 31 - $195
A basic understanding of sprinkler system mechanical operation and maintenance is required for this course.

Electrical Troubleshooting Part I - Diagnosing Field Wiring Problems
September 1 (1/2 day class) - $95
A basic understanding of sprinkler system mechanical operation and maintenance is required for this course.

Electrical Troubleshooting Part II - Transformers, DC Systems, 2 Wire Systems and Controller Grounding
September 2 - $175
Suggested prerequisite: working knowledge of irrigation systems and equipment. Past attendance in the Electrical Troubleshooting Part I class is required. Irrigation System Installation and Maintenance class is a good preparatory classes.

Irrigation System Evaluation Short Courses

Evaluation Class 1: Theory and Laboratory Practice of Evaluations
June 14 to 16, 2004
Location: Cal Poly, San Luis Obispo
Fee: $200
This first class is ITRC's traditional comprehensive 2 1/2 day class which combines classroom and outdoor laboratory activities. Efficiency definitions and techniques of evaluation are emphasized, ranging from how to take a pressure measurement to what specific measurements are needed for evaluation of six distinct irrigation methods. These systems can be "tuned up" to conserve water and power, and to maintain adequate surface water and groundwater qualities.

Evaluation Class 2: San Joaquin Valley Field Evaluation of Drip/Micro Systems
June 16 to 18, 2004
Location: 2 fields - San Joaquin Valley
Fee: $100
This second class is a *new* 2 1/2 day class where we will travel to the San Joaquin Valley and perform the entire evaluations on 2 fields. The emphasis will be on performing the field evaluations for drip and microspray irrigation systems on trees/vines. It is highly recommended that those attending this field session attend Class 1 or have field experience doing irrigation evaluations. *Note: add $50 if ITRC is to provide transportation from San Luis Obispo.*

The Irrigation District School of Irrigation
The Cal Poly ITRC, on behalf of the Mid-Pacific Region of the U.S. Bureau of Reclamation, is providing the eighth annual series of training and educational opportunities for staff, engineers, and board members of agricultural irrigation districts, as well as field operators. The classes utilize the excellent indoor and outdoor facilities at Cal Poly.

Courses for Irrigation District Field Operators
Each one-day class is offered on 2 dates. Fee: $30/person/day - all U.S. irrigation districts; $150/person/day - participants from outside the U.S.

Flow Measurement - General and Pipelines
February 3 or March 16
Topics include: Principles of flow measurement for open and closed systems; common measurement devices - propeller, velocity head, venturi, metergate; and how to take accurate readings: what to watch out for.

Flow Measurement - Canals
February 4 or March 17
Topics include: Weirs and flumes, corrections for common problems and current metering.

Canal Operation
February 5 or March 18
Topics include: The service concept, including farmer constraints and needs; purposes of different check structures; water level vs. flow rate control; minimizing tailender problem while still achieving good service; how to get more water through various structures; introduction to SCADA; and interaction between canals and turnouts.

Pump Efficiency Testing Class
March 9 to 10, 2004 or
September 7 to 8, 2004
Fee: $40/person, California residents; $120/person, out-of-state residents; $240/person, international
This 2-day class combines inside and outside instruction. Participants are requested to bring their pump testing equipment. Topics include: general pump terms, flow Rate Measurements, pressure/TDH measurements, power measurements, pump test equations, flow rate measurement, pressure/TDH measurement, and power measurement.

DWR Releases Draft Proposal Solicitation Package Proposition 50—2004 Water Use Efficiency Grants

The *Draft* 2004 Water Use Efficiency Proposal Solicitation Packagehas been released by the Department of Water Resources and is available for review and public comment. This grant program implements Water Code Chapter 7, Section 79550 (g) of Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002. The PSP can be found on the DWR Web site at www.owue.water.ca.gov. For more information contact Debra Gonzalez (916) 651-7026 or e-mail debrag@water.ca.gov.

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Address Correction Requested

DWR Issues Guidebook for Senate Bill 610 and Senate Bill 221: "Show Me the Water"

By Dave Todd

The Department of Water Resources recently issued the *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221* to assist water suppliers, cities, and counties in integrating water and land use planning. Popularly known as the "Show me the water" bills, they became effective January 1, 2002.

SB 610 (Costa) (Chapter 643, Statutes of 2001) and SB 221 (Kuehl) (Chapter 642, Statutes of 2001) require that approvals of large new developments be linked to assurances that there is an adequate water supply. A year ago, DWR issued a draft guidebook for SB 610 and SB 221. Minor revisions and a few clarifications have been added to the recently issued guidebook. Cities, counties and water agencies have been using it to achieve compliance with the laws; the guidebook is also being used by planners, developers and consultants. It provides step-by-step suggestions for developing detailed information about water supplies and completing the SB 610 water supply assessment and the SB 221 verification of sufficient water supply. DWR has no regulatory, permitting or any other approval authority concerning water assessments or verifications of sufficient water supply. The guidebook is an assistance tool only. The information provided in the guidebook is not all-inclusive and is not required to be used. In case of any conflict between suggestions contained in the guidebook and any applicable laws, those laws shall have precedence.

The guidebook was developed with input from the bills' sponsor, East Bay Municipal Utility District, as well as the State Attorney General's Office, counties, cities, water agencies, the U.S. Bureau of Reclamation, State Department of Real Estate, California Association of Local Agency Formation Commissions, Sacramento Local Agency Formation Commission, Water Education Foundation, Planning and Conservation League, California Urban Water Conservation Council, and the development community.

The guidebook, as well as a list of frequently asked questions with responses, is available on the DWR Office of Water Use Efficiency Web site at: www.owue.water.ca.gov. If you require additional information, please contact Dave Todd of the DWR Office of Water Use Efficiency at (916) 651-7027 or e-mail dtodd@water.ca.gov.